

Identifying facilitators and barriers for home injury prevention interventions for pre-school children: a systematic review of the quantitative literature

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Abstract

Injuries are the leading cause of childhood death internationally; steep social gradients exist in mortality and morbidity. The majority of pre-school injuries occur in the home, but implementing research into practice for injury prevention has received little attention. This systematic review describes key facilitators and barriers when implementing injury prevention interventions. The review used articles included in a Cochrane systematic review of the effectiveness of home safety education, with or without the provision of safety equipment. Each paper was screened to ensure that children under 5 years, intervention details and process measures and/or barriers and facilitators were included. Two authors independently reviewed each paper and extracted data. Themes were identified and framework analysis used in an iterative process. Ninety-nine papers were identified, 42 excluded and 57 included in the analysis. Seven facilitators and six barriers were identified. Facilitators related to the approach used, focused messages, minimal changes, deliverer characteristics, equipment accessibility, behaviour change and including incentives. The barriers included complex interventions,

cultural, socio-economic, physical and behavioural barriers and deliverer constraints. Barriers and facilitators should be addressed when implementing injury prevention interventions and studies should explicitly explore factors that help or hinder the process.

Introduction

Young children under the age of 5 years experience the majority of their injuries in the environment where they spend the most time and where they feel most secure—the home. They are exposed to a range of hazards as they go about their every day life; exposed because of their lack of skills and expertise; to hazardous environments; and limited both by their physical and psychological development and by the ability of their carers and society as a whole to protect them from harm. Unintentional injury is the leading cause of death in children aged 1–4 years [1]. In 2008, 91 children aged 0–4 years in England and Wales died as a result of an injury; 29% died from road injuries and the remainder from injuries in the home and leisure environments [2]. Falls, poisonings and thermal injuries (the majority of which are scalds) are the most common injuries resulting in hospital admission and Emergency Department (ED) use in this age group. Each year more than 241 000 0- to

4-year olds attend EDs in the United Kingdom [3] and more than 22 000 children are admitted to hospital in England following a fall, poisoning or thermal injury [4]. The cost of these ED attendances alone exceeds £17million per year [5].

The WHO World and European reports on child injury prevention demonstrate that the problem of child injuries is universal [6, 7]. Some countries have much lower injury rates than others but no one country tops all the league tables for safety.

Child injury prevention intervention proven to be effective in one setting may not always translate to other settings. Widespread implementation of programmes that ‘work’ has still not taken place. There are substantial gaps in the transfer of knowledge and understanding from research to practice and how to get robust evidence on effective interventions into routine practice [8, 9]. Practitioners often find that systematic reviews ‘do not reflect the reality of implementation on the ground’ [9]. Translation of research into widespread practice thus needs to encompass not just an understanding of the contents of the intervention but also the process by which it can be adapted to different contexts, conditions and target groups. For example, a safety equipment programme may need to consider whether the equipment is provided free or at a low cost, who provides the equipment, whether it is fitted, who is the target group and how the target group is best reached. More detailed documentation of the barriers and facilitators of a particular programme are thus required.

It is important to find out not only which interventions are effective but also how, under what conditions, and in what contexts a given intervention may be made to work to maximum effect [10]. It has been suggested that systematic reviews that ‘focus on measuring and reporting on programme effectiveness, often find that the evidence is mixed or conflicting and provide little or no clue as to why the intervention worked or did not work when applied in different contexts or circumstances, deployed by different stakeholders or used for different purposes’ [11]. Hence although reviews may identify which interventions are effective, translating such evidence into practice may prove difficult. One suggested solution is the production of ‘a sort of highway code

to programme building, alerting policymakers to the problems that they might expect to confront and some of the safest (i.e. best-trying and with widest applications) measures to deal with these issues. The highway code does not tell you how to drive, but how to survive the journey by flagging situations where danger may be lurking and extra vigilance is needed’ [11]. Information from reviews of barriers and facilitators to implementing interventions is a vital component of such a ‘highway code’.

This article describes a systematic review of quantitative studies of home injury prevention programmes targeting the families of pre-school children; it investigates the barriers and facilitators relating to the implementation of these programmes.

Methods

The objective was to review systematically the quantitative evidence on barriers and facilitators to implementing home safety education, with or without the provision of safety equipment, to prevent unintentional injuries in pre-school children. This systematic review used the articles included in a Cochrane systematic review of the effectiveness of home safety education, with or without the provision of safety equipment, undertaken by one of the authors in 2007 [12] and those identified from searches to update the review in 2009. The search strategies used were those described in the Cochrane review [12].

Types of studies

Study designs included were randomized and non-randomized controlled trials (including quasi-randomized studies) and controlled before and after studies.

Types of participants

Children aged 5 years and under and their families.

Types of interventions

Interventions included in the review were home safety education provided by health or social care professionals, lay workers or voluntary or other

organizations, to individual, or groups of, children or families, aiming to increase home safety practices or use of home safety equipment or reduce home injuries. Interventions offered in health care settings (primary care and secondary care e.g. primary care practices, clinics, out patient departments EDs and hospital wards) and the homes of children and families were included. Community-based trials with multi-faceted interventions were included if they incorporated individual home safety education or group education. Interventions involving the provision of free, low cost or discounted safety equipment were also included.

To be eligible for the review of barriers and facilitators, the content of the intervention had to be described in detail, the focus had to be children aged 5 years or under and the article had to identify process measures and/or report barriers/facilitators to success. The first two aspects were required and one or both of the latter two.

Search strategy for identification of studies

The sources searched are shown in Supplementary data, available at *Health Education Research* online. The searches for the Cochrane review were undertaken in June 2004 and all sources were searched up to 31st March 2009 for the update to the review.

Methods of the review

All the papers included in the Cochrane review of home safety education and provision of safety equipment for injury prevention [12] were assessed for inclusion in this systematic review of barriers and facilitators, along with the results of the updated search for the Cochrane review.

Two authors (shared between J.I., T.D., E.T., G.E. and B.K.) independently screened abstracts of articles to identify papers relevant to this systematic review of barriers and facilitators. If an article was eligible, two authors independently reviewed each paper and completed a data extraction form. The paper data extraction details were transferred to an Excel spreadsheet.

An iterative process was used to develop the themes and framework analysis explored these

themes in all the papers selected for review [13]. Initial themes were identified after 10 papers had been reviewed and subsequent papers were analysed using these themes. Further themes were identified after 30 papers had been screened and previous papers reanalysed to include the new themes. Data extraction was compared between authors for all eligible articles and a summary sheet of all barriers and facilitators was drawn up. Finally, the themes were subdivided by a succession of related sub-themes. Any differences between reviewers in the barriers and facilitators found from the papers were discussed during the iterations of the themes. This formed part of the process of expanding the number of themes and including any additional complementary topics found.

Results

Ninety-nine papers were identified, 42 were excluded and 57 included in the analysis (see Fig. 1 and Supplementary data, available at *Health Education Research* online, for details of the studies). Reasons for excluding studies are shown in Fig. 1 and included 14 papers which only had an abstract or unpublished data; 9 that did not identify any

Studies in review

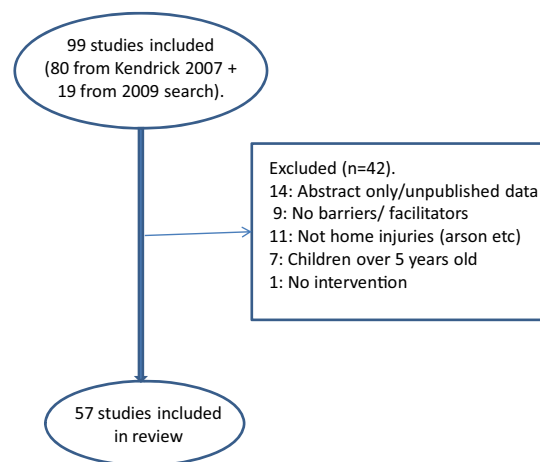


Fig. 1. Flow diagram of studies included in the review.

Table I. Facilitator and barrier themes and sub-themes identified from 57 intervention papers on home injury prevention interventions for pre-school children

Facilitators	Barriers
1 Approach: Home visits; combined educational and environmental; community involvement; partnership working; tailored methods	Cultural barriers: Distrust of home visits; language barriers; lifestyle; generalizability
2 Focused message: One injury type; tailored to the individual; simple message	Socio-economic: Low literacy; low income; ethnicity
3 Minimal changes: Educational; physical	Complex interventions: Multiple injuries; multiple methods
4 Role of the deliverer: Benefits to participants—using health professionals, other professionals or volunteers; benefits to the deliverer; time and place	Deliverer constraints: Training; time involved; sustainability; communication
5 Accessibility to equipment: Free provision and fitting of safety equipment; coupons; information	Physical barriers: Rented accommodation; multiple occupancy; frequent moves; access to devices; faulty devices
6 Behaviour change: Reinforcing messages; motivational techniques; theoretical models used; organizational change; community involvement and awareness	Behavioural barriers: Existing behaviour; behaviour change
7 Incentives	

barriers or facilitators for the intervention; 11 that focused on injuries outside the home; 7 papers focussed on children over 5 years old and 1 where no intervention was described.

Seven key facilitators and six barriers were identified in the implementation of health promotion and injury prevention interventions as shown in Table I. Some facilitators and barriers were more commonly reported than others and the distribution across the studies is shown in Table II. Overall, a median of four facilitators (mean 3.7) and two barriers (mean 2.2) were found for each of the 57 included papers.

Some themes were included as both barriers and facilitators, such as characteristics of the deliverer, complex or simple messages and behaviour changes. However, initially, we have described the individual themes and sub-themes for facilitators and barriers separately.

Facilitators

1) Approaches used

- (i) Home visits by appointment with provision of safety equipment and concentrating on home injury were felt to improve the success of interventions and use of safety devices and to reduce risks.
- (ii) A combination of tailored education and environmental measures (active and passive interventions) was identified in many studies as important for success. Sessions which incorporated health education linked to the causes of home injuries were well accepted by parents and found to be cost effective to deliver.
- (iii) Community involvement and awareness-raising helped to reduce the stigma from parenting interventions: advice from community leaders, using volunteer community workforce as home visitors

Table II. *Facilitators and barriers for home injury interventions for pre-school children for each study included in the review*

Author	Date	Facilitators							Barriers					
		F1	F2	F3	F4	F5	F6	F7	B1	B2	B3	B4	B5	B6
Babul	2007	✓		✓	✓	✓	✓				✓			✓
Carman	2006	✓			✓	✓	✓		✓	✓	✓			
Coggan	2000	✓	✓		✓				✓					
Colver	1982	✓	✓	✓		✓			✓					✓
Diguiseppi	2002		✓		✓	✓	✓		✓	✓	✓		✓	✓
Emond	2002				✓		✓				✓			
Fergusson	1982	✓	✓	✓								✓		
Georgieff	2004	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓
Gielen	2002				✓		✓		✓		✓		✓	✓
Gielen	2007	✓	✓		✓		✓							
Guyer	1989	✓					✓				✓			✓
Harvey	2004	✓	✓	✓	✓	✓	✓					✓	✓	
Hendrickson	2005	✓			✓	✓			✓	✓				
Jenkins	1996	✓	✓		✓		✓		✓				✓	
Johnston	2000	✓			✓	✓	✓				✓			
Katcher	1989			✓	✓	✓	✓		✓				✓	
Kelly	1987		✓				✓				✓	✓		
Kelly	2003	✓	✓	✓	✓			✓		✓				
Kendrick	1999	✓	✓		✓	✓		✓			✓			
Kendrick	2010		✓		✓	✓	✓			✓		✓	✓	✓
King	2001	✓	✓	✓	✓	✓					✓			✓
Krug	1994	✓				✓				✓		✓	✓	
Lebailly	1990					✓	✓			✓	✓	✓	✓	✓
Llewellyn	2003	✓			✓						✓	✓	✓	
Mallonee	2000	✓	✓	✓	✓	✓	✓	✓						✓
Mcdonald	2005	✓	✓	✓	✓	✓	✓	✓		✓		✓		
McLoughlin	1982	✓									✓	✓		✓
Miller	1982	✓	✓	✓	✓	✓			✓		✓		✓	
Mock	2003	✓	✓	✓	✓	✓	✓			✓		✓		
Mueller	2008	✓		✓	✓	✓			✓				✓	
Nansel	2002	✓	✓	✓	✓		✓			✓		✓		
Nansel	2008	✓	✓		✓		✓			✓		✓		✓
Odendaal	2009	✓			✓	✓	✓	✓			✓	✓	✓	
Olds	1994	✓			✓		✓		✓					✓
Ozanne-smith	2002	✓			✓		✓				✓	✓		
Paul	1994		✓		✓	✓				✓		✓	✓	
Petridou	1997	✓		✓	✓				✓				✓	
Pless	2007	✓			✓							✓		✓
Posner	2004	✓	✓	✓	✓	✓							✓	
Rey	1993	✓												✓
Sangvai	2007	✓	✓	✓	✓				✓		✓			✓
Schelp1987	1987	✓	✓		✓	✓	✓				✓	✓		
Schlesinger	1996	✓										✓		
Schwarz	1993			✓	✓		✓				✓		✓	
Schwebel	2009	✓	✓		✓					✓				✓
Svanstrom	1995	✓												
Swart	2008		✓	✓	✓	✓			✓					✓
Sznajder	2003	✓			✓	✓	✓	✓	✓			✓	✓	

Table II. Continued

Author	Date	Facilitators							Barriers					
		F1	F2	F3	F4	F5	F6	F7	B1	B2	B3	B4	B5	B6
Thomas	1984	✓		✓	✓		✓	✓					✓	✓
Vineis	1994	✓	✓		✓									✓
Waller	1993	✓	✓		✓							✓	✓	✓
Watson	2005	✓	✓		✓		✓		✓				✓	✓
Woolf	1987	✓	✓		✓	✓								✓
Woolf	1992	✓	✓	✓	✓	✓	✓		✓				✓	✓
Yang	2008			✓		✓	✓		✓					✓
Ytterstad	1995	✓	✓			✓	✓				✓			
Zhang	2003	✓	✓		✓		✓		✓	✓				

to reach high-risk populations and to optimize the possibility of change, and sensitizing the whole community to normalize safety practices were all described as successful approaches to take.

- (iv) Partnership working with a range of other organizations, including the National Health Service (NHS), local authorities, lay and voluntary groups and the media, to produce effective joint working were features of several successful studies.
- (v) Tailored methods for different socio-economic, ethnic and educational groups were felt to be more likely to change behaviour especially for those with less education.

2) A focused message

Some studies highlighted the success of this approach if they concentrated on one type of injury, a specific age of child or had a single focus.

- (i) One injury-type messages included studies that took a narrow high-risk target population with a high rate of scald injuries and gave specific advice about home hazards, hot water education and reducing water temperature. Others focused on fire prevention and safety or targeted a few well-focused evidence-based areas.
- (ii) Interventions tailored to the individual were shown to be successful by some. These included age/stage appropriate messages to a child's age and family circumstances and individual behaviours with a clear focus, using foreign languages as appropriate and promotional material. Also

used were a programme of home visits designed to meet specific needs, computer-tailored programmes that allowed individual parent/child attributes to create personalized safety messages and video delivery in relevant languages.

- (iii) Keeping messages short and simple were seen in successful studies of thermostatic mixer valves for reducing bath water temperature, and interventions for safer use of kerosene were reported as being easier to reproduce in other areas.

3) Minimal changes

- (i) Educational materials included tailored hand-outs, easy to use instructions and stickers to encourage use of devices and reinforce messages featured in many studies.
- (ii) Physical changes requiring minimal simple non-repetitive action to implement (such as lowering hot water temperature) were more likely to be successful as they are easy to achieve. However, despite water temperature being lowered, it was sometimes not low enough to prevent scalds. Provision of safety equipment with free installation (such as smoke alarms) required only minimal effort by participants and so were those that had greatest effect.

4) Characteristics of the deliverer

- (i) Using child health professionals to deliver safety messages at pre-arranged appointments at home or the clinic had many benefits since they were

trusted familiar figures and many had established relationships with families.

- (ii) Other professionals, such as family caseworkers or parent educators, were used in some studies. They also had on-going relationships with the families and so were accepted in the home.
- (iii) Other studies used trained lay community volunteers and felt that they were important since they were able to deliver messages in the primary language of participants or were of the same ethnic origin. Trained local volunteers were more acceptable to some communities and their involvement was retained with team-building activities.
- (iv) There were also benefits to the deliverers of the study interventions: improved communication and counselling skills and provision of anticipatory guidance about home safety, which helped with sustaining the interventions.
- (v) The time or place of delivering the intervention was highlighted in some studies, including using a computer kiosk in a busy ED and a paediatric setting providing credibility and relevance for some messages.

5) *Accessibility to safety equipment*

- (i) Provision and free fitting of safety equipment, particularly for low-income families, was important to the success of many studies, including thermostatic mixer valves to reduce hot water temperature, installation of smoke alarms with annual battery replacement and provision of cheap water thermometers.
- (ii) Provision of coupons to purchase equipment was less successful in increasing equipment use.
- (iii) Studies which did not have funds to provide free equipment gave advice, information about local suppliers and facilitated access to equipment for low-income families. While this was better than nothing, it was not found to be as successful as provision and free fitting.

6) *Behaviour change models*

Many studies, particularly those published more recently, discussed the behaviour change models used

in their studies to try to change the behaviour of participants.

- (i) Simple methods for reinforcing messages by sending annual reminders, continued contact with health professionals who reminded them, and group sessions in clinics and poster displays were all described as having some success.
- (ii) Motivational techniques were used to change behaviour, such as an elaboration likelihood model for injury prevention education, where motivation was shown to be greater when information was perceived as personally relevant to participants.
- (iii) Increasing self-efficacy through skills training was used successfully in several studies. Others used combinations of self-efficacy with health belief models, behaviour profiles and educational principles, which have been shown to be effective for other health education interventions. These combinations were thought to maximize the potential for behaviour change.
- (iv) Several studies stressed the importance of achieving organizational change (particularly in local government) to increase safety behaviours. Others used a combination of multi-component, multi-agency and media attention to achieve their goals.
- (v) An important factor in many studies was the involvement and awareness of the local community, which improved participation and increased accident risk awareness over a longer period of time than the study lasted. Several studies suggested that it is vital to understand community perceptions and values and address them in order to be able to influence behaviour changes.

7) *Incentives*

A range of incentives were used to encourage participation in the studies, including financial incentives to complete outcome assessments, free first-aid training and crèche facilities, activities for children while parents attended training and vouchers.

Barriers

1) Cultural barriers

- (i) Parents in some studies in disadvantaged areas were suspicious of unannounced home visits due to mistrust of the health system, child protection fears, immigration issues and/or fear of strangers in their home.
- (ii) Language barriers restricted access to injury prevention strategies in some studies. In communities with great diversity, implementing interventions was found to be challenging since using interpreting services and translators proved difficult in some areas.
- (iii) Some studies reported that their intervention period had not been long enough to reverse life-long cultural influences and lifestyles.
- (iv) Other studies had taken place in populations that may not be generalizable to wider more diverse communities.

2) Socio-economic barriers

- (i) Low literacy levels of participants hampered some studies since there was a lack of understanding of written materials that had been provided.
- (ii) Families living with economic constraints would often choose food and daily living costs over the provision of safety equipment.
- (iii) In addition to the financial cost of equipment, correct installation required time, appropriate tools and skills to use them.
- (iv) Transient populations who frequently moved house posed difficulties for staff in contacting participants to complete or sustain interventions.

3) Complex interventions

- (i) Interventions that tried to cover a variety of injuries were not always successful and addressing too many home safety topics in one intervention often did not achieve persistent learning.
- (ii) Using multiple messages in one programme meant that it was often difficult to isolate factors for success.

- (iii) Using multiple methods in a complex intervention, such as a combination of several active and passive measures, could require several behaviour changes, which would be less sustainable and potentially less transferrable. It is not possible to disaggregate the impact of using multiple methods in an intervention to find out which part was successful.
- (iv) Complex interventions were often limited by and dependent on practitioner skills, which made them less successful.

4) Deliverer constraints

- (i) Programmes that required large amounts of staff training were often unsuccessful due to time constraints. This resulted in variable levels of expertise in both health professionals and volunteers, which translated into a lack of staff skills to be able to influence participant behaviour changes.
- (ii) Interventions that required a high level of staff time to deliver and assess were often too onerous to complete. Similar constraints were found when volunteers delivered a programme.
- (iii) Such resource and training implications meant that programmes were unlikely to be sustainable over longer periods of time.

5) Physical barriers

- (i) Rented accommodation was an important barrier to participants fitting safety equipment. They worried about landlords objecting, nuisance levels of alarms in small flats and crowded living spaces, and the costs of structural changes and improvements to homes they did not own.
- (ii) Participants who moved house frequently sometimes removed devices when they left or their children left home.
- (iii) Difficulty in obtaining safety devices, lack of correct fitting of devices, lack of skill to fit them and understanding of information provided were all barriers to improved use. If after

fitting the devices broke or were faulty, this also contributed to poor compliance.

6) Behavioural barriers

- (i) Parents' existing behaviour influenced both their participation in studies and their willingness to change practice. These included habits and traditions, beliefs that they could supervise their children adequately and reliance on reasoning, rules or punishment.
- (ii) Translation of knowledge to practice is a difficult behaviour change to achieve and brief one-off educational interventions, single home visits, awareness-raising campaigns or anticipatory guidance were not shown to be effective in several studies. Parents needed motivation to fit equipment and reinforcement to maintain changes in behaviour. The social background of families was suggested as a factor to be taken into account when trying to achieve complex changes in behaviour.

Discussion

The review of facilitators and barriers to injury prevention interventions from 57 studies has identified a number of discrete and overlapping themes. The approach used, deliverer characteristics, the complexity of the intervention, accessibility to safety equipment and the importance of behavioural change all provided both facilitators and barriers to the success of interventions.

Tailored home visits using a combination of educational and environmental change methods seem to work well but cultural barriers and distrust may cause them to fail. Limiting the message to one injury type and encouraging simple, non-repetitive changes was more successful, since complex interventions were both difficult to deliver and to assess. A trusted deliverer was shown to be important in building up a relationship to gain access to participants and long time-consuming programmes were too resource

intensive to be sustainable. Free provision and fitting of equipment were advantageous for homeowners but less successful in rented accommodation.

Behavioural change was emphasized in many studies with researchers using a range of theoretical models to effect change. The models chosen were intervention and study specific, ranging from those that were community orientated, through those that aimed to change health beliefs and to those targeting self-efficacy change based on social learning theory. Studies reported that it was important to understand community perceptions and values, the social background of families and to explore any cultural barriers before being able to influence changes in behaviour, including overcoming strongly held existing beliefs and views about supervision of children. Despite many authors discussing behaviour change models, very few were able to identify the success or failure of the theoretical approach selected.

Limitations to the studies found in the reviews included the length of follow-up available and the contamination of control groups. Several studies reported that longer follow-up was needed to test the durability of any changes seen and so they were not able to provide evidence of sustainability. Some reported that the intervention was too short and not enough home visits were available to collect follow-up data. Many studies also relied upon self-reported behaviour change outcome measures that were not validated and using postal questionnaires rather than objective home assessments. Such questionnaires were often poorly completed in areas with low literacy levels. A range of factors were described in studies which had led to the control group participants changing their behaviour by getting access to intervention booklets, vouchers, home safety assessments and other activities in the area. These reduced any differences seen between intervention and control group outcomes and diluted the effects of the safety interventions. Our review, by necessity, focussed on barriers and facilitators identified by authors of included studies. Little detail was provided in most papers about how authors became aware of these barriers and facilitators and rarely was there any explicit attempt by authors to study barriers and facilitators to implementing their interventions. Also barriers and

facilitators operate on many levels, including those receiving as well as those providing the intervention. Few studies explored the perceptions of those receiving interventions and their barriers and facilitators may well differ from those of the study investigators.

The National Institute for Health and Clinical Excellence has produced guidance on the most appropriate interventions to support changing health related behaviours [14]. When planning interventions, they recommend partnership working, prioritizing evidence-based interventions, those tailored to individuals' needs and those developed with the target population. When delivering public health interventions at the individual level, they advise selecting interventions that help people understand the consequences of health-related behaviours, support people in feeling positive about changing their behaviour and enable them to set behaviour change goals. They argue that community-level interventions should include programmes promoting parenting skills, improving self-efficacy and developing social networks. Our review echoes many of these findings including targeted programmes involving a combination of education and environmental change and those that measure or involve behaviour change models.

Implications for research and practice

Many of the studies we reviewed did not explicitly study barriers and facilitators to implementing interventions, and few explored these from a variety of perspectives including families and children, the deliverers of interventions or other stakeholders. Future studies should explicitly incorporate rigorous exploration of barriers and facilitators to implementing their interventions in order that the factors that help or hinder implementation can be better understood. In addition, although many of the papers we reviewed included information on barriers and facilitators, this was often difficult to find and was presented in a wide variety of ways. Greater standardization of reporting would aid future evidence synthesis in this area.

Those implementing evidence-based interventions into practice need to take account of potential barriers and facilitators to this process, which are relevant for their specific context, intervention and

population. Implementing interventions without addressing such factors is likely to lead to suboptimal outcomes.

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Conflict of interest statement

None declared.

References

- Office for National Statistics. *Mortality Statistics: Childhood, Infant and Perinatal*. Series DH3 No 36. London UK: Office for National Statistics, 2005.
- Office for National Statistics. *Mortality Statistics Cause DR-08. Review of the Registrar General on Deaths by Cause Age and Sex in England and Wales*, Newport, UK: Office for National Statistics, 2009.
- Department for Trade and Industry. *24th (final) Report of the Home and Leisure Accident Surveillance System, 2000, 2001 and 2002 data*. London, UK: Department for Trade and Industry, 2003.
- Department of Health. *Hospital Episode Statistics 2005/6*. Department of Health, 2007. Available at: <http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=211>. Accessed: July 2009.
- Audit Commission, Health Care Commission. *Better Safe than Sorry: Preventing Unintentional Injury to Children*. London, UK: The Audit Commission, 2007.
- Peden M, Oyegbite K, Ozanne-Smith J *et al.* (eds) *World Report on Child Injury Prevention*. Geneva, Switzerland: World Health Organization, 2008.
- Sethi D, Towner E, Vincenten J *et al.* (eds) *European Report on Child Injury Prevention*. Copenhagen, Denmark: World Health Organization Regional Office for Europe, 2008.
- Brussoni M, Towner E, Hayes M. Evidence into practice: combining the art and science of injury prevention. *Inj Prev* 2006; **12**: 373–7.
- Roen K, Arai L, Roberts H *et al.* Extending systematic reviews to include evidence on implementation: methodological work

- on a review of community-based initiatives to prevent injuries. *Soc Sci Med* 2006; **63**: 1060–71.
10. Aria L, Roen K, Roberts H *et al.* It might work in Oklahoma but will it work in Oakhampton? Context and implementation in the effectiveness literature on domestic smoke detectors. *Inj Prev* 2005; **11**: 148–51.
 11. Pawson R, Greenhalgh T, Harvey G *et al.* Realist review—a new method of systematic review designed for complex policy interventions. *J Health Serv Res Policy* 2005; **10**(Suppl. 1): 21–34.
 12. Kendrick D, Coupland C, Mulvaney C *et al.* Home safety education and provision of safety equipment for injury prevention. *Cochrane Database of Systematic Reviews* 2007; Issue 1. Art. No.: CD005014 DOI: 10.1002/14651858.CD005014.pub2
 13. Pope C, Ziebland S, Mays N. Qualitative research in health care: analysing qualitative data. *BMJ* 2000; **320**: 114–6.
 14. NICE public health guidance 6. *Behaviour Change at Population, Community and Individual levels*. London, UK: NICE, 2007. Available at: www.nice.org.uk/PH006.